BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

As rescanning documents *will not* correct images, please do not report the images to the Image Problem Mailbox.

WE CLAIM:

1. A high aperture color liquid crystal display including color filters, the display comprising:

first and second substrates;

a liquid crystal layer sandwiched between said first and second substrates;

first and second different colored pixels, said first pixel including on said first substrate a first pixel electrode, a first insulating color filter, and a first thin-film transistor (TFT), and said second pixel including on said first substrate a second pixel electrode, a second insulating color filter, and a second TFT, wherein said first and second color filters are differently colored;

said first and second pixel electrodes overlapping corresponding address lines in communication with respective TFTs so as to define a high aperture display, said overlapping forming areas of overlap;

said first insulating color filter being at least partially disposed in an area of overlap in said first pixel between said first pixel electrode and an address line, said first color filter having a dielectric

constant of less than about 5.0 and having a first contact hole defined therein that allows said first pixel electrode to be electrically connected to said first TFT; and

said second insulating color filter being at least partially disposed in an area of overlap in said second pixel between said second pixel electrode and an address line, said second color filter having a dielectric constant less than about 5.0 and having a second contact hole defined therein that allows said second pixel electrode to be electrically connected to said second TFT.

2. The LCD of claim 1, wherein said pixel electrodes are conductive, and are of a thickness of from about 300 Å - 900 Å in order to reduce interface stress between the pixel electrodes and the color filters.

3. The LCD of claim 1, wherein said color filters are each formed of a negative resist.

4. The LCD of claim 1, wherein each of said color filters has a refractive index of from about 1.5 to 2.0.

5. The LCD of claim 1, wherein the dielectric constant ϵ of each of said color filters is less than about 4.0.

6. The LCD of claim 1, wherein each of said color filters is of a photo-imageable material.

7. The LCD of claim 1, wherein each of said filters is from about 1.5 - 2.5 μm thick, and wherein said first pixel electrode overlaps a first one of said address lines, said second pixel electrode overlaps a second one of said address lines.

8. The LCD of claim 1, wherein said color filters overlap said address lines to a greater extent than do corresponding pixel electrodes.

9. The LCD of claim 1, wherein the pixel aperture ratio of the LCD is at least about 68% and wherein each

of said color filters is patterned into an elongated strip covering a plurality of pixels across the viewing area of the display.

10. The LCD of claim 1, wherein the areas of overlap are filled with color filters, and the overlap areas have a width across the address lines of from about 0.1 to 2.0 μm in the overlap areas and the filters are of a material and thickness so that the address line-pixel capacitance is from about 4.5 to 10 fF.

11. The LCD of claim 10, wherein the capacitance is less than about 7.0 fF.

12. A pixel having a photo-imageable color filter in a liquid crystal display, the pixel comprising:

first and second substrates;

a liquid crystal layer sandwiched between said first and second substrates;

a thin film transistor (TFT) provided on said first substrate including a gate electrode, a drain electrode, and a source electrode;

a first address line provided on said first substrate, said first address line in communication with said gate electrode;

a second address line provided on said first substrate, said second address line in communication with said drain electrode;

a pixel electrode provided on said first substrate, said pixel electrode overlapping at least a portion of said TFT and overlapping at least a portion of one of said address lines so as to define areas of overlap;

a color filter insulating layer provided on said first substrate in said areas of overlap, said color filter insulating layer having a dielectric constant ε less than about 5.0 and a thickness of at least about 1.0 μm in said areas of overlap;

wherein said color filter includes a contact hole defined therein proximate said source electrode so that said pixel electrode electrically communicates with said source electrode through said contact hole; and

wherein said color filter overlaps said address line(s) to a greater extent than does said pixel electrode.

13. The pixel of claim 12, wherein said color filter is one of a red, green, and blue color filter, and wherein said color filter has a dielectric constant of less than or equal to about 4.0, and wherein said areas of overlap have a width of at least about 0.5 μm.

14. The pixel of claim 12, wherein said color filter is a resist, and includes a color pigment or dye, and a thickness of from about 1.5 to 2.5 μm in said areas of overlap.

15. The pixel of claim 12, wherein said color filter is of a material and thickness such that a liquid crystal display including a plurality of such color filters can exhibit a white light contrast ratio of at least about 10:1 over a horizontal angular span, at a predetermined vertical angle, of at least about 120° and over a vertical angular span of greater than about 50° at

a predetermined horizontal angle when predetermined retarders are provided in the display.

16. The pixel of claim 12, wherein said color filter and said pixel electrodes each overlap at least a portion of said first and second address lines, and wherein said color filter overlaps each of said address lines to a greater degree than does said pixel electrode.

17. The pixel of claim 16, wherein said color filter is of a material and thickness so that in one of said address line areas of overlap, the line-pixel capacitance is from about 4.5 to 10.0 fF when the length of said one area is a reference of about 100 μm.

18. The pixel of cliam 12, wherein the pixel electrode has a thickness of from about 300Å - 900Å.

19. A method of making a color liquid crystal display having strips of insulating color filters, the method comprising the steps of:

providing first and second substrates;

providing a liquid crystal material;

forming an array of isolation switching elements on said first substrate and a plurality of address lines in communication with said isolation switching elements;

depositing a first resist color filter layer on said first substrate over top of said address lines and said switching elements;

photo-imaging said first resist color filter layer so as to pattern it into a first array of elongated strips on said first substrate so that color filters in said first array are of a first color and overlap at least a portion of at least two address lines;

depositing a second resist color filter layer of a second color over top of said first array of color filters;

photo-imaging said second resist color filter layer so as to pattern it into a second array of elongated strips so that color filters in said second array overlap at least a portion of at least two address lines;

depositing a third resist color filter layer of a third color over top of said first and second arrays of color filters;

photo-imaging said third resist color filter layer so as to pattern it into a third of elongated strips array so that color filters in said third array overlap at least a portion of at least two address lines;

forming contact holes in color filters in each of said first, second, and third arrays;

depositing a conductive pixel electrode layer over top of said first, second, and third arrays of color filters; and

patterning said electrode layer so as to form an array of pixel electrodes wherein pixel electrodes in said array overlap address lines which are also overlapped by color filters so that said color filters act as insulators between said pixel electrodes and address lines in areas of overlap, and wherein each of said pixel electrodes is in electrical communication with a corresponding switching element through one of said contact holes, and wherein each of said color filters has

a greater surface area than do corresponding pixel electrodes.

20. The method of claim 19, wherein said method steps are performed in the order in which they are recited, and each of said color filters has a dielectric constant of less than or equal to about 4.0.